

MINING AND QUARRYING TRENDS

By Jean K. Moore

Domestic survey data were prepared by the author, Mary E. Ewell, and each of the statistical assistants who has responsibility for the commodities indicated.

The mining and quarrying trends shown in this report were calculated from nonfuel mineral data reported to the U.S. Geological Survey (USGS) by mining and quarrying companies operating in the United States. The data for 1999 were reported on the Mine, Development, and Mineral Exploration Supplement, a statistical survey conducted by the USGS, and on the production surveys for some more widely produced nonfuel mineral commodities, such as sand and gravel, for which the available data are extracted from computer files. Additional data for 1999 were derived from annual USGS production and consumption surveys of nonfuel mineral producers; these surveys covered 58 nonfuel mineral commodities produced in the United States.

Nonfuel minerals exclude coal, petroleum, coke, and related products.

As shown in this report, mining and quarrying data for 1999 include the annual data for construction sand and gravel and crushed and dimension stone. From 1981 to 1993, these mineral commodities were surveyed biennially and appeared alternately in this report. The inclusion of both sets of data in this report results in essentially a complete coverage of nonfuel mineral production in the United States. Comparisons of the 1994 to 1999 data with previously reported annual data, however, are not possible.

The data in the following tables are reported according to the primary product of a mine or operation. The primary product is usually determined by the product with the highest total value for the year. In some instances, the values of two products at the same operation are so close that the products are coproducts. To account for the data without double counting, however, a product of lesser value is considered to be a byproduct.

Total domestic mining of nonfuel mineral materials

amounted to 5.4 billion metric tons (Gt) in 1999 compared with 6 Gt in 1998. These materials included 3.9 Gt of crude ore mined or quarried and 1.4 Gt of mine waste and ore from development. Of the nonfuel mineral materials mined, 61% was for the production of industrial minerals and 39% was for the production of metals. Overall, 98% of nonfuel minerals was mined and quarried at surface level, and 2% was mined underground.

Total surface mining and quarrying for industrial minerals amounted to 3.2 Gt, remaining essentially the same as that of 1998. Crude ore mined at these surface operations was 2.8 Gt, and 380 million metric tons (Mt) was waste and ore from development. Underground mining for industrial minerals amounted to only 106 Mt, of which nearly all was crude ore.

Total surface mining for metal ores came to 2.1 Gt, a 20% decrease compared with that of 1998. Of the 2.1 Gt, about one-half was crude ore mined and the other one-half was waste and ore from development. Surface mining of copper, gold, and iron accounted for a large amount of the total surface mining, and each decreased significantly. The decrease in copper mining was the biggest and was attributed to low prices, mine cutbacks, and at least three closures. The decrease in iron mining was attributable to its primary consumer, the steel industry, becoming less dependent on iron. Underground mining of metal ores amounted to only 27 Mt, of which 94% was crude ore.

The major States in which mining for nonfuel minerals took place were, in order of total material handled, Nevada, Arizona, Florida, California, Minnesota, Utah, Michigan, Texas, New Mexico, and Ohio. These 10 States accounted for about 62% of the nonfuel minerals mined in the United States. Virtually all nonfuel mining in these States was conducted from the surface.

TABLE 1
MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES, BY TYPE 1/

(Million metric tons)

| Type and year | Surface 2/ | | | Underground 3/ | | | All mines | | |
|---------------------------------|------------|----------|----------|----------------|----------|--------|-----------|----------|----------|
| | Crude ore | Waste 4/ | Total | Crude ore | Waste 4/ | Total | Crude ore | Waste 4/ | Total |
| Metals: | | | | | | | | | |
| 1995 | 922 | 1,580 | 2,500 | 53 | 2 | 55 | 975 | 1,580 | 2,560 |
| 1996 | 1,160 | 1,600 | 2,760 | 49 | 3 | 51 | 1,210 | 1,600 | 2,810 |
| 1997 | 1,170 | 1,630 | 2,800 | 52 | 3 | 55 | 1,220 | 1,630 r/ | 2,860 |
| 1998 | 1,100 | 1,500 r/ | 2,600 r/ | 50 | 3 | 53 | 1,150 | 1,500 r/ | 2,650 r/ |
| 1999 | 1,020 | 1,050 | 2,070 | 26 | 2 | 27 | 1,050 | 1,050 | 2,100 |
| Industrial minerals: | | | | | | | | | |
| 1995 | 2,360 r/ | 457 r/ | 2,820 r/ | 104 | 3 | 106 | 2,470 r/ | 460 r/ | 2,930 r/ |
| 1996 | 2,440 r/ | 435 r/ | 2,870 r/ | 112 r/ | 3 | 114 r/ | 2,550 r/ | 438 r/ | 2,990 r/ |
| 1997 | 2,530 r/ | 409 r/ | 2,940 r/ | 111 r/ | (5/) | 111 | 2,640 r/ | 409 r/ | 3,050 r/ |
| 1998 | 2,770 r/ | 428 r/ | 3,190 r/ | 109 r/ | 1 | 109 | 2,870 r/ | 428 r/ | 3,300 r/ |
| 1999 | 2,790 | 380 | 3,170 | 106 | (5/) | 106 | 2,890 | 381 | 3,270 |
| All mineral commodities: | | | | | | | | | |
| 1995 | 3,290 r/ | 2,040 r/ | 5,320 r/ | 156 | 5 | 161 | 3,440 r/ | 2,040 | 5,480 r/ |
| 1996 | 3,600 r/ | 2,030 | 5,630 r/ | 160 r/ | 6 | 166 r/ | 3,760 r/ | 2,040 r/ | 5,790 r/ |
| 1997 | 3,700 r/ | 2,040 | 5,740 r/ | 163 | 4 r/ | 167 r/ | 3,860 r/ | 2,040 | 5,910 r/ |
| 1998 | 3,870 r/ | 1,930 r/ | 5,790 | 159 r/ | 4 | 163 r/ | 4,030 r/ | 1,930 r/ | 5,960 |
| 1999 | 3,810 | 1,430 | 5,240 | 131 | 2 | 133 | 3,940 | 1,430 | 5,370 |

r/ Revised.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Includes materials from wells, ponds, and pumping operations.

3/ Includes solution mining.

4/ Includes ore and waste from development operations.

5/ Less than 1/2 unit.

TABLE 2
MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1999,
BY COMMODITY AND STATE 1/

(Thousand metric tons)

| | Number of mines 4/ | Surface 2/ | | | Underground 3/ | | | All mines | | |
|------------------------------|--------------------|------------|-----------|------------|----------------|----------|-----------|------------|-----------|------------|
| | | Crude ore | Waste 5/ | Total | Crude ore | Waste 5/ | Total | Crude ore | Waste 5/ | Total |
| Metal ores: | | | | | | | | | | |
| Gold | 51 | 209,000 | 632,000 | 841,000 | 4,110 | 646 | 4,760 | 213,000 | 633,000 | 846,000 |
| Iron | 12 | 192,000 | 142,000 | 334,000 | W | -- | W | 192,000 6/ | 142,000 | 334,000 |
| Zinc | 10 | W | W | W | 5,020 | W | 5,020 7/ | 5,020 8/ | W | 5,020 7/ |
| Other 9/ | 45 | 622,000 | 273,000 | 895,000 | 16,600 | 1,080 | 17,700 | 639,000 | 274,000 | 912,000 |
| Total | 118 | 1,020,000 | 1,050,000 | 2,070,000 | 25,700 | 1,730 | 27,400 | 1,050,000 | 1,050,000 | 2,100,000 |
| Industrial minerals: | | | | | | | | | | |
| Barite | 7 | 969 | W | 969 7/ | -- | -- | -- | 969 | W | 969 |
| Clays | 631 | 41,900 | 36,500 | 78,400 | W | W | W | 41,900 6/ | 36,500 6/ | 78,400 |
| Feldspar 10/ | 12 | 1,090 | -- | 1,090 | -- | -- | -- | 1,090 | -- | 1,090 |
| Garnet | 4 | 51 | -- | 51 | -- | -- | -- | 51 | -- | 51 |
| Gypsum | 60 | 20,400 | 3,010 | 23,400 | 2,160 | -- | 2,160 | 22,600 | 3,010 | 25,600 |
| Magnesium compounds | 6 | 2,580 | 408 | 2,990 | -- | -- | -- | 2,580 | 408 | 2,990 |
| Mica (scrap) | 10 | 973 | W | 973 7/ | -- | -- | -- | 973 | W | 973 7/ |
| Phosphate rock | 18 | 161,000 | W | 161,000 7/ | -- | -- | -- | 161,000 | W | 161,000 7/ |
| Pumice 11/ | 16 | 695 | W | 695 7/ | -- | -- | -- | 695 | W | 695 7/ |
| Salt | 70 | 5,340 | -- | 5,340 | 33,600 | W | 33,600 7/ | 39,000 | W | 39,000 7/ |
| Sand and gravel: | | | | | | | | | | |
| Construction | 7,740 | 1,070,000 | -- | 1,070,000 | -- | -- | -- | 1,070,000 | -- | 1,070,000 |
| Industrial | 139 | 27,600 | -- | 27,600 | W | -- | W | 27,600 6/ | -- | 27,600 |
| Soda ash | 6 | -- | -- | -- | 10,200 | -- | 10,200 | 10,200 | -- | 10,200 |
| Stone: | | | | | | | | | | |
| Crushed | 3,540 | 1,440,000 | 115,000 | 1,550,000 | 46,000 | 322 | 46,300 | 1,480,000 | 116,000 | 1,600,000 |
| Dimension | 190 | 1,210 | 617 | 1,830 | 40 | -- | 40 | 1,250 | 617 | 1,870 |
| Talc and pyrophyllite | | | | | | | | | | |
| Tripoli | 19 | 761 | 1,080 | 1,850 | W | W | W | 761 6/ | 1,080 6/ | 1,850 |
| Other 12/ | 6 | 92 | -- | 92 | -- | -- | -- | 92 | -- | 92 |
| Total | 74 | 13,300 | 224,000 | 237,000 | 13,500 | 111 | 13,600 | 26,800 | 224,000 | 251,000 |
| Grand total | 12,500 | 2,790,000 | 380,000 | 3,170,000 | 106,000 | 433 | 106,000 | 2,890,000 | 381,000 | 3,270,000 |
| States: | 12,700 | 3,810,000 | 1,430,000 | 5,240,000 | 131,000 | 2,160 | 133,000 | 3,940,000 | 1,430,000 | 5,370,000 |
| Alabama | 181 | 65,800 | 6,310 | 72,100 | W | W | W | 65,800 6/ | 6,310 6/ | 72,100 |
| Alaska | 238 | 45,500 | 15,000 | 60,500 | W | W | W | 45,500 6/ | 15,000 6/ | 60,500 |
| Arizona | 243 | W | W | W | W | -- | W | W | W | W |
| Arkansas | 179 | 43,500 | 4,470 | 48,000 | W | -- | W | 43,500 6/ | 4,470 | 48,000 |
| California | 622 | 236,000 | 74,500 | 310,000 | W | -- | W | 236,000 6/ | 74,500 | 310,000 |
| Colorado | 377 | 68,700 | 18,400 | 87,200 | W | W | W | 68,700 6/ | 18,400 6/ | 87,200 |
| Connecticut | 92 | 13,600 | 624 | 14,200 | -- | -- | -- | 13,600 | 624 | 14,200 |
| Delaware | 16 | 2,100 | -- | 2,100 | -- | -- | -- | 2,100 | -- | 2,100 |
| Florida | 189 | 264,000 | W | 264,000 7/ | 18 | (13/) | 18 | 264,000 | W | 264,000 7/ |
| Georgia | 210 | 83,400 | 15,300 | 98,700 | 1,000 | 7 | 1,010 | 84,400 | 15,300 | 99,700 |
| Hawaii | 34 | 6,160 | 452 | 6,610 | -- | -- | -- | 6,160 | 452 | 6,610 |
| Idaho | 233 | 37,100 | 17,000 | 54,100 | 638 | -- | 638 | 37,700 | 17,000 | 54,700 |
| Illinois | 307 | 108,000 | 5,850 | 114,000 | 3,470 | 24 | 3,500 | 111,000 | 5,870 | 117,000 |
| Indiana | 251 | 83,400 | 5,020 | 88,400 | W | W | W | 83,400 6/ | 5,020 6/ | 88,400 |
| Iowa | 405 | 48,700 | 3,300 | 52,000 | 6,720 | W | 6,720 7/ | 55,500 | 3,300 6/ | 58,800 |
| Kansas | 347 | 33,400 | 2,290 | 35,700 | 3,250 | 7 | 3,250 | 36,700 | 2,300 | 39,000 |
| Kentucky | 141 | 53,800 | 4,380 | 58,100 | 16,600 | 116 | 16,700 | 70,300 | 4,500 | 74,800 |
| Louisiana | 149 | 19,600 | W | 19,600 7/ | 16,200 | -- | 16,200 | 35,700 | W | 35,700 7/ |
| Maine | 184 | 12,300 | 360 | 12,700 | -- | -- | -- | 12,300 | 360 | 12,700 |
| Maryland | 79 | 33,700 | 2,280 | 36,000 | W | W | W | 33,700 6/ | 2,280 6/ | 36,000 |
| Massachusetts | 142 | 22,500 | 953 | 23,400 | -- | -- | -- | 22,500 | 953 | 23,400 |
| Michigan | 569 | 159,000 | W | 159,000 7/ | 2,000 | -- | 2,000 | 161,000 | W | 161,000 7/ |
| Minnesota | 597 | 203,000 | 98,500 | 301,000 | -- | -- | -- | 203,000 | 98,500 | 301,000 |
| Mississippi | 109 | 14,200 | 1,020 | 15,200 | -- | -- | -- | 14,200 | 1,020 | 15,200 |

See footnotes at end of table.

TABLE 2--Continued
MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1999,
BY COMMODITY AND STATE 1/

(Thousand metric tons)

| | Number of mines 4/ | Surface 2/ | | | Underground 3/ | | | All mines | | |
|--------------------|-----------------------|------------|-----------|------------|----------------|----------|----------|------------|-----------|------------|
| | | Crude ore | Waste 5/ | Total | Crude ore | Waste 5/ | Total | Crude ore | Waste 5/ | Total |
| States--Continued: | | | | | | | | | | |
| Missouri | 355 | 82,700 | 7,010 | 89,700 | 10,300 | 25 | 10,300 | 92,900 | 7,040 | 100,000 |
| Montana | 269 | 39,500 | W | 39,500 7/ | 980 | W | 980 7/ | 40,500 | W | 40,500 7/ |
| Nebraska | 179 | 16,800 | 500 | 17,300 | W | W | W | 16,800 6/ | 500 6/ | 17,300 |
| Nevada | 176 | 176,000 | 559,000 | 735,000 | 2,390 | 495 | 2,890 | 178,000 | 559,000 | 737,000 |
| New Hampshire | 86 | 12,300 | 363 | 12,700 | -- | -- | -- | 12,300 | 363 | 12,700 |
| New Jersey | 94 | 42,100 | 2,040 | 44,100 | -- | -- | -- | 42,100 | 2,040 | 44,100 |
| New Mexico | 178 | W | W | W | W | W | W | W | W | W |
| New York | 611 | 78,800 | 4,860 | 83,600 | 3,910 | -- | 3,910 | 82,700 | 4,860 | 87,500 |
| North Carolina | 267 | 91,700 | 10,700 | 102,000 | -- | -- | -- | 91,700 | 10,700 | 102,000 |
| North Dakota | 225 | 11,800 | W | 11,800 7/ | -- | -- | -- | 11,800 | W | 11,800 7/ |
| Ohio | 396 | 124,000 | 7,620 | 131,000 | W | W | W | 124,000 6/ | 7,620 6/ | 131,000 |
| Oklahoma | 163 | 51,800 | 3,530 | 55,300 | W | W | W | 51,800 6/ | 3,530 6/ | 55,300 |
| Oregon | 409 | 41,000 | 3,820 | 44,900 | -- | -- | -- | 41,000 | 3,820 | 44,900 |
| Pennsylvania | 369 | 108,000 | 7,820 | 115,000 | 1,410 | 10 | 1,420 | 109,000 | 7,830 | 117,000 |
| Rhode Island | 25 | 3,520 | 166 | 3,690 | -- | -- | -- | 3,520 | 166 | 3,690 |
| South Carolina | 131 | 42,000 | 3,430 | 45,500 | -- | -- | -- | 42,000 | 3,430 | 45,500 |
| South Dakota | 285 | 21,800 | W | 21,800 7/ | W | -- | W | 21,800 6/ | W | 21,800 7/ |
| Tennessee | 199 | 66,600 | 5,630 | 72,200 | 9,560 | W | 9,560 7/ | 76,100 | 5,630 6/ | 81,700 |
| Texas | 531 | 187,000 | 11,200 | 198,000 | W | W | W | 187,000 6/ | 11,200 6/ | 198,000 |
| Utah | 244 | 114,000 | W | 114,000 7/ | 617 | -- | 617 | 115,000 | W | 115,000 7/ |
| Vermont | 124 | 9,950 | 783 | 10,700 | W | -- | W | 9,950 6/ | 783 | 10,700 |
| Virginia | 217 | 77,300 | 8,120 | 85,400 | W | -- | W | 77,300 6/ | 8,120 | 85,400 |
| Washington | 388 | 63,500 | 1,650 | 65,200 | W | W | W | 63,500 6/ | 1,650 6/ | 65,200 |
| West Virginia | 63 | 12,700 | 1,140 | 13,800 | 2,680 | W | 2,680 7/ | 15,300 | 1,140 6/ | 16,500 |
| Wisconsin | 604 | 71,600 | 2,800 | 74,400 | -- | -- | -- | 71,600 | 2,800 | 74,400 |
| Wyoming | 179 | 16,500 | 3,520 | 20,000 | 9,040 | -- | 9,040 | 25,600 | 3,520 | 29,100 |
| Undistributed 14/ | -- | 593,000 | 506,000 | 1,100,000 | 40,600 | 1,480 | 42,100 | 633,000 | 508,000 | 1,140,000 |
| Grand total | 12,700 | 3,810,000 | 1,430,000 | 5,240,000 | 131,000 | 2,160 | 133,000 | 3,940,000 | 1,430,000 | 5,370,000 |

W Withheld to avoid disclosing company proprietary data. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Includes materials from wells, ponds, and pumping operations.

3/ Includes solution mining.

4/ Includes quarries and other mineral operations.

5/ Includes ore and waste from development operations.

6/ Excludes materials from underground operations.

7/ Excludes waste from mining operations and ore and waste from development operations.

8/ Excludes materials from surface operations.

9/ Includes beryllium, copper, gold-silver, lead, magnesium metal, molybdenum, platinum and palladium, rare-earth metal concentrates, silver, titanium, uranium, and metals indicated by symbol W.

10/ Includes aplite.

11/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

12/ Includes abrasives, boron minerals, bromine, diatomite, emery, greensand marl, iodine, iron oxide pigments, kyanite, lithium minerals, magnesite, olivine, perlite, potash, sericite, sulfur (Frasch), vermiculite, wollastonite, zeolites, and industrial minerals indicated by symbol W.

13/ Less than 1/2 unit.

14/ Includes States indicated by symbol W.

TABLE 3
VALUE OF PRINCIPAL MINERAL PRODUCTS AND BYPRODUCTS OF SURFACE AND UNDERGROUND MINES
IN THE UNITED STATES IN 1999 1/

(Dollars per metric ton)

| Type of ore and commodity | Surface | | | Underground | | | All mines | | |
|---|---------------------------|------------|-----------|---------------------------|------------|----------|---------------------------|------------|-----------|
| | Principal mineral product | By-product | Total | Principal mineral product | By-product | Total | Principal mineral product | By-product | Total |
| Metals: | 6.97 | 0.62 | 7.59 | 46.43 | 8.36 | 54.78 | 7.86 | 0.80 | 8.66 |
| Gold | 10.45 | 0.30 | 10.74 | 66.97 | 0.63 | 67.60 | 11.37 | 0.30 | 11.67 |
| Iron | 8.01 | -- | 8.01 | W | -- | W | 8.01 2/ | -- | 8.01 |
| Zinc | W | W | W | 52.40 | W | 52.40 | 52.40 3/ | W | 52.40 4/ |
| Industrial minerals: | 6.58 | 0.02 | 6.60 | 17.61 | 0.71 | 18.32 | 6.98 | 0.04 | 7.03 |
| Abrasives | 6,426.03 | -- | 6,426.03 | -- | -- | -- | 6,426.03 | -- | 6,426.03 |
| Barite | 11.49 | -- | 11.49 | -- | -- | -- | 11.49 | -- | 11.49 |
| Clays | 37.32 | -- | 37.32 | W | -- | W | 37.32 2/ | -- | 37.32 |
| Diatomite | 90.52 | -- | 90.52 | -- | -- | -- | 90.52 | -- | 90.52 |
| Feldspar 5/ | 32.73 | W | 32.73 4/ | -- | -- | -- | 32.73 | W | 32.73 4/ |
| Garnet | 110.74 | -- | 110.74 | -- | -- | -- | 110.74 | -- | 110.74 |
| Gypsum | 6.95 | -- | 6.95 | 6.85 | -- | 6.85 | 6.94 | -- | 6.94 |
| Iodine | 14,697.93 | -- | 14,697.93 | -- | -- | -- | 14,697.93 | -- | 14,697.93 |
| Magnesium compounds | 56.50 | W | 56.50 4/ | -- | -- | -- | 56.50 | W | 56.50 4/ |
| Mica (scrap) | 17.74 | W | 17.74 4/ | -- | -- | -- | 17.74 | W | 17.74 4/ |
| Pumice 6/ | 25.75 | -- | 25.75 | -- | -- | -- | 25.75 | -- | 25.75 |
| Salt | 82.96 | -- | 82.96 | 16.80 | W | 16.80 4/ | 24.57 | W | 24.57 4/ |
| Sand and gravel: | | | | | | | | | |
| Construction | 4.73 | W | 4.73 4/ | -- | -- | -- | 4.73 | W | 4.73 4/ |
| Industrial | 18.66 | W | 18.66 4/ | W | -- | W | 18.66 2/ | W | 18.66 4/ |
| Soda ash | -- | -- | -- | 74.85 | W | 74.85 4/ | 74.85 | W | 74.85 4/ |
| Stone: | | | | | | | | | |
| Crushed | 5.35 | W | 5.35 4/ | 5.35 | -- | 5.35 | 5.35 | W | 5.35 4/ |
| Dimension | 202.52 | -- | 202.52 | 221.68 | 1.52 | 223.20 | 203.13 | 0.05 | 203.17 |
| Talc and pyrophyllite | 27.47 | W | 27.47 4/ | W | -- | W | 27.47 2/ | W | 27.47 4/ |
| Industrial minerals, excluding sand and gravel and stone 7/ | 19.90 | 0.20 | 20.10 | 26.38 | 1.24 | 27.62 | 21.22 | 0.41 | 21.63 |
| Metals and industrial minerals 7/ 8/ | 6.69 | 0.19 | 6.87 | 23.06 | 2.16 | 25.22 | 7.23 | 0.25 | 7.48 |
| Metals and industrial minerals, excluding sand and gravel and stone 7/ 8/ | 9.33 | 0.54 | 9.87 | 32.17 | 3.30 | 35.47 | 10.73 | 0.71 | 11.45 |

W Withheld to avoid disclosing company proprietary data; included in appropriate "Average." -- Zero.

1/ Values calculated from unrounded data; may not add to totals shown because of independent rounding.

2/ Value of products at surface operations only.

3/ Value of products at underground operations only.

4/ Value of principal mineral product only.

5/ Includes aplite.

6/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

7/ Includes values of asbestos, boron minerals, bromine, clays, emery, greensand marl, iron oxide pigments, kyanite, lithium minerals, magnesite, olivine, perlite, phosphate rock, potash, sericite, soda ash, sulfur (Frasch), tripoli, vermiculite, wollastonite, zeolites, and industrial minerals indicated by symbol W.

8/ Includes values of beryllium concentrate, copper, gold-silver ore, lead, magnesium metal, molybdenum, platinum and palladium, rare-earth metal concentrate, silver, titanium, and metals indicated by symbol W.

TABLE 4
 TWENTY-FIVE LEADING METAL AND INDUSTRIAL MINERAL MINES AND QUARRIES
 IN THE UNITED STATES IN 1999, IN ORDER OF OUTPUT OF CRUDE ORE

| Type of ore and name of mine, quarry or operation 1/ | State | Operator | Commodity | Mining method |
|--|----------------|---|-----------------------|-----------------------|
| Metal ores: | | | | |
| Morenci | Arizona | Phelps Dodge Corp. | Copper-molybdenum ore | Open pit. |
| Tyrone | New Mexico | do. | Copper ore | Do. |
| Bingham Canyon | Utah | Kennecott Utah Copper Corp. | do. | Do. |
| Minnac | Minnesota | USX Corp. | Iron ore | Do. |
| Chino | New Mexico | Phelps Dodge Corp. | Copper-molybdenum ore | Do. |
| Round Mountain | Nevada | Round Mountain Gold Corporation | Gold ore | Do. |
| Bagdad | Arizona | Phelps Dodge Corp. | Copper ore | Do. |
| Hibbing Taconite Co. | Minnesota | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| Carlin Mines Complex (7) | Nevada | Newmont Gold Company | Gold ore | Open pit and stoping. |
| Empire Iron Mining Partnership | Michigan | Cleveland-Cliffs, Inc. | Iron ore | Open pit. |
| LTV Steel Mining Co. | Minnesota | do. | do. | Do. |
| Ray | Arizona | ASARCO Incorporated | Copper ore | Do. |
| National Steel Pellet Co. | Minnesota | National Steel Pellet Co. | Iron ore | Do. |
| Mission Complex | Arizona | ASARCO Incorporated | Copper ore | Open pit and stoping. |
| Continental | Montana | Montana Resources Inc. | Copper-molybdenum ore | Open pit. |
| Fort Knox | Alaska | Fairbanks Gold Mining Inc. | Gold ore | Do. |
| Tilden Mining Co. | Michigan | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| Sierrita | Arizona | Phelps Dodge Corp. | Copper-molybdenum ore | Do. |
| Thunderbird | Minnesota | EVTAC Mining Co. | Iron ore | Do. |
| Mesquite | California | Newmont Gold Company | Gold ore | Do. |
| Miami (Inspiration) | Arizona | Phelps Dodge Corp. | Copper ore | Do. |
| Northshore Mining Co. | Minnesota | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| Florida Canyon | Nevada | Florida Canyon Mining, Inc. | Gold ore | Do. |
| Cresson | Colorado | Cripple Creek & Victor Gold Mining Co. | do. | Do. |
| Twin Creeks | Nevada | Newmont Gold Company | do. | Do. |
| Industrial Minerals: | | | | |
| Florida mines (6) | Florida | IMC-Agrico Co. | Phosphate rock | Do. |
| Florida mines (2) | do. | Cargill Fertilizer Inc. | do. | Do. |
| Florida mines (1) | do. | PCS Phosphate Co., Inc. | do. | Do. |
| South Pasture | do. | C F Industries, Inc. | do. | Do. |
| F E C Quarry | do. | CSR America, Inc. | Stone | Open quarry. |
| Aurora | North Carolina | PCS Phosphate Co., Inc. | Phosphate rock | Open pit. |
| Georgetown | Texas | Texas Crushed Stone Co., Inc. | Stone | Open quarry. |
| Stoneport Quarry | Michigan | LTV Steel Co., Inc. | do. | Do. |
| Pennsuco | Florida | Tarmac America, Inc. | do. | Do. |
| White Rock Quarries (1) | do. | Vecellio & Grogan, Inc. | do. | Dredging. |
| McCook 378 | Illinois | Vulcan Materials Co. | do. | Open quarry. |
| Calcite Operation | Michigan | Michigan Limestone Operations | do. | Do. |
| Bridgeport Stone Plant | Texas | TXI Operations, L.P. | do. | Do. |
| Thornton | Illinois | General Dynamics Corp. | do. | Do. |
| Hunter Quarry | Texas | Hunter Industries, Inc., Colorado Materials Co. | do. | Do. |
| IMC-Carlsbad | New Mexico | IMC Kalium Ltd. | Potash | Stoping |
| Reed Quarry | Kentucky | Vulcan Materials Co. | Stone | Open quarry. |
| GKK Mines | Florida | GKK Corp. | do. | Do. |
| Crushed Limestone Operation | Missouri | Tower Rock Stone Co. | do. | Do. |
| Sun Valley | California | Vulcan Materials Co. | Sand and gravel | Open pit. |
| Wingate Creek | Florida | Nu-Gulf Industries, Inc. | Phosphate rock | Do. |
| Servtex | Texas | Hanson Building Materials America | Stone | Open quarry. |
| Three Rivers | Kentucky | Martin Marietta Aggregates | do. | Do. |
| Cape Sandy | Indiana | Mulzer Crushed Stone Co., Inc. | do. | Do. |
| Norcross | Georgia | Vulcan Materials Co. | do. | Do. |

1/ Owing to commodity reporting differences, the rank of individual mining operations may not be available.

TABLE 5
 TWENTY-FIVE LEADING METAL AND INDUSTRIAL MINERAL MINES AND QUARRIES
 IN THE UNITED STATES IN 1999, IN ORDER OF OUTPUT OF TOTAL MATERIAL HANDLED

| Type of ore and mine, quarry or operation 1/ | State | Operator | Commodity | Mining method |
|---|----------------|---|-----------------------|-----------------------|
| Metal ores: | | | | |
| Morenci | Arizona | Phelps Dodge Corp. | Copper-molybdenum ore | Open pit. |
| Barrick Goldstrike | Nevada | Barrick Gold Corporation | Gold ore | Open pit and stoping. |
| Bingham Canyon | Utah | Kennecott Utah Copper Corp. | Copper-molybdenum ore | Open pit. |
| Tyrone | New Mexico | Phelps Dodge Corp. | Copper ore | Do. |
| Twin Creeks | Nevada | Newmont Gold Company | Gold ore | Do. |
| Mission Complex | Arizona | ASARCO Incorporated | Copper ore | Do. |
| Ray | Arizona | do. | do. | Do. |
| Carlin Mines Complex (7) | Nevada | Newmont Gold Company | Gold ore | Open pit and stoping. |
| Round Mountain | do. | Round Mountain Gold Corporation | do. | Open pit. |
| Minnatc | Minnesota | USX Corp. | Iron ore | Do. |
| Cortez | Nevada | Placer Dome (U.S.) Inc. | Gold ore | Do. |
| Empire Iron Mining Partnership | Michigan | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| LTV Steel Mining Co. | Minnesota | do. | do. | Do. |
| Jerritt Canyon | Nevada | Independence Mining Co., Inc. | Gold ore | Do. |
| Hibbing Taconite Co. | Minnesota | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| Robinson | Nevada | BHP Copper Co. | Gold and copper ore | Do. |
| Chino | New Mexico | Phelps Dodge Corp. | Copper-molybdenum ore | Do. |
| McCoy/Cove | Nevada | Echo Bay Mines Limited | Gold ore | Open pit and stoping. |
| Lone Tree | do. | Newmont Gold Company | do. | Open pit. |
| National Steel Pellet Co. | Minnesota | National Steel Pellet Co. | Iron ore | Do. |
| Bagdad | Arizona | Phelps Dodge Corp. | Copper ore | Do. |
| Tilden Mining Co. | Michigan | Cleveland-Cliffs, Inc. | Iron ore | Do. |
| Continental | Montana | Montana Resources Inc. | Copper-molybdenum ore | Do. |
| Fort Knox | Alaska | Fairbanks Gold Mining Inc. | Gold ore | Do. |
| Cresson | Colorado | Cripple Creek & Victor Gold Mining Co. | do. | Do. |
| Industrial minerals: | | | | |
| Florida mines (6) | Florida | IMC-Agrico Co. | Phosphate rock | Do. |
| Florida mines (2) | do. | Cargill Fertilizer Inc. | do. | Do. |
| Boron | California | U.S. Borax Inc. | Boron | Do. |
| Florida mines (1) | Florida | PCS Phosphate Co., Inc. | Phosphate rock | Do. |
| South Pasture | do. | C F Industries, Inc. | do. | Do. |
| Aurora | North Carolina | PCS Phosphate Co., Inc. | do. | Do. |
| F.E.C. Quarry | Florida | CSR America, Inc. | Stone | Open quarry. |
| Nichols | do. | Agrifos, L.L.C. | Phosphate rock | Open pit. |
| Georgetown | Texas | Texas Crushed Stone Co., Inc. | Stone | Open quarry. |
| Stoneport Quarry | Michigan | LTV Steel Co., Inc. | do. | Do. |
| Pennsuco | Florida | Tarmac America, Inc. | do. | Do. |
| White Rock Quarries (1) | do. | Vecellio & Grogan, Inc. | do. | Dredging. |
| McCook 378 | Illinois | Vulcan Materials Co. | do. | Open quarry. |
| Calcite Operation | Michigan | Michigan Limestone Operations | do. | Do. |
| Bridgeport Stone Plant | Texas | TXI Operations, L.P. | do. | Do. |
| Thornton | Illinois | General Dynamics Corp. | do. | Do. |
| Hunter Quarry | Texas | Hunter Industries, Inc., Colorado Materials Co. | do. | Do. |
| Reed Quarry | Kentucky | Vulcan Materials Co. | do. | Do. |
| IMC-Carlsbad | New Mexico | IMC Kalium Ltd. | Potash | Stoping. |
| GKK Mines | Florida | GKK Corp | Stone | Open quarry. |
| Crushed Limestone Operation | Missouri | Tower Rock Stone Co. | do. | Do. |
| Servtex | Texas | Hanson Building Materials America | do. | Do. |
| Three Rivers | Kentucky | Martin Marietta Aggregates | do. | Do. |
| Cape Sandy | Indiana | Mulzer Crushed Stone Co., Inc. | do. | Do. |
| Norcross | Georgia | Vulcan Materials Co. | do. | Do. |

1/ Owing to commodity reporting differences, the rank of individual mining operations may not be available.

TABLE 6
MARKETABLE PRODUCT AND ORE TREATED OR SOLD AT SURFACE AND UNDERGROUND MINES
IN THE UNITED STATES IN 1999, BY SELECTED COMMODITY AND STATE 1/

(Thousand metric tons)

| | Marketable product | | | Ore treated or sold | | |
|-----------------------------|--------------------|-------------|-----------|---------------------|-------------|-----------|
| | Surface | Underground | Total | Surface | Underground | Total |
| Metal ores: | | | | | | |
| Copper | 1,630 2/ | W | 1,630 | W | W | W |
| Gold | W | W | W | 252,000 | 4,180 | 257,000 |
| Iron ore (usable) | 58,500 2/ | W | 58,500 | 192,000 3/ | W | 192,000 |
| Zinc | 900 2/ | W | 900 | 12,900 3/ | W | 12,900 |
| Industrial minerals: | | | | | | |
| Barite | W | -- | W | 969 | -- | 969 |
| Clays | 41,900 2/ | W | 41,900 | 41,900 3/ | W | 41,900 |
| Diatomite | 747 | -- | 747 | 1,960 | -- | 1,960 |
| Feldspar 4/ | 1,090 | -- | 1,090 | 1,090 | -- | 1,090 |
| Garnet | 51 | -- | 51 | 51 | -- | 51 |
| Gypsum | 20,300 | 2,160 | 22,400 | 20,400 | 2,160 | 22,600 |
| Iodine | 2 | -- | 2 | 2 | -- | 2 |
| Iron oxide pigments | 27 2/ | W | 27 | W | W | W |
| Magnesium compounds | 393 | -- | 393 | 2,580 | -- | 2,580 |
| Mica (scrap) | 166 | -- | 166 | 804 | -- | 804 |
| Phosphate rock | 40,600 | -- | 40,600 | 161,000 | -- | 161,000 |
| Pumice 5/ | 643 | -- | 643 | 691 | -- | 691 |
| Salt | W | 43,500 6/ | 43,500 | W | 43,500 7/ | 43,500 |
| Sand and gravel: | | | | | | |
| Construction | 1,110,000 | -- | 1,110,000 | 1,110,000 | -- | 1,110,000 |
| Industrial | 28,600 2/ | W | 28,600 | 28,600 3/ | W | 28,600 |
| Soda ash | -- | 10,400 | 10,400 | -- | 10,400 | 10,400 |
| Stone: | | | | | | |
| Crushed | 1,490,000 | 46,000 | 1,540,000 | 1,490,000 | 46,000 | 1,540,000 |
| Dimension | 1,210 | 40 | 1,250 | 1,210 | 40 | 1,250 |
| Talc and pyrophyllite | 1,030 2/ | W | 1,030 | 1,030 3/ | W | 1,030 |
| Tripoli | 85 | -- | 85 | 92 | -- | 92 |
| Vermiculite | 175 | -- | 175 | W | -- | W |
| States: | | | | | | |
| Alabama | 69,600 2/ | W | 69,600 | 69,600 3/ | W | 69,600 |
| Alaska | 12,100 2/ | W | 12,100 | 43,000 3/ | W | 43,000 |
| Arizona | 66,100 2/ | W | 66,100 | 488,000 3/ | W | 488,000 |
| Arkansas | 44,300 2/ | W | 44,300 | 44,300 3/ | W | 44,300 |
| California | 215,000 2/ | W | 215,000 | 249,000 3/ | W | 249,000 |
| Colorado | 59,400 2/ | W | 59,400 | 69,400 | 35 | 69,400 |
| Connecticut | 13,700 | -- | 13,700 | 13,700 | -- | 13,700 |
| Delaware | 2,100 | -- | 2,100 | 2,100 | -- | 2,100 |
| Florida | 151,000 | 18 | 151,000 | 266,000 | 18 | 266,000 |
| Georgia | 93,100 | 1,000 | 94,100 | 94,200 | 1,000 | 95,200 |
| Hawaii | 6,380 | -- | 6,380 | 6,380 | -- | 6,380 |
| Idaho | 25,400 2/ | W | 25,400 | 67,900 | 638 | 68,500 |
| Illinois | 112,000 | 3,470 | 116,000 | 112,000 | 3,470 | 116,000 |
| Indiana | 90,700 2/ | W | 90,700 | 90,700 3/ | W | 90,700 |
| Iowa | 51,800 | 6,720 | 58,500 | 51,800 | 6,720 | 58,500 |
| Kansas | 35,600 | 3,240 | 38,800 | 35,600 | 3,240 | 38,800 |
| Kentucky | 54,600 | 16,600 | 71,200 | 54,600 | 16,600 | 71,200 |
| Louisiana | 21,300 | 16,200 | 37,600 | 21,300 | 16,200 | 37,600 |
| Maine | 12,600 | -- | 12,600 | 12,600 | -- | 12,600 |
| Maryland | 35,500 2/ | W | 35,500 | 35,500 3/ | W | 35,500 |
| Massachusetts | 24,500 | -- | 24,500 | 24,500 | -- | 24,500 |
| Michigan | 133,000 | 1,620 | 134,000 | 160,000 | 1,720 | 161,000 |
| Minnesota | 95,500 | -- | 95,500 | 204,000 | -- | 204,000 |
| Mississippi | 15,300 | -- | 15,300 | 15,300 | -- | 15,300 |
| Missouri | 84,500 | 4,250 | 88,800 | 84,500 | 10,300 | 94,800 |
| Montana | 16,200 2/ | W | 16,200 | 39,700 | 980 | 40,700 |

See footnotes at end of table.

TABLE 6--Continued
MARKETABLE PRODUCT AND ORE TREATED OR SOLD AT SURFACE AND UNDERGROUND MINES
IN THE UNITED STATES IN 1999, BY SELECTED COMMODITY AND STATE 1/

(Thousand metric tons)

| | Marketable product | | | Ore treated or sold | | |
|--------------------|--------------------|-------------|---------|---------------------|-------------|---------|
| | Surface | Underground | Total | Surface | Underground | Total |
| States--Continued: | | | | | | |
| Nebraska | 19,300 2/ | W | 19,300 | 19,300 3/ | W | 19,300 |
| Nevada | 42,600 2/ | W | 42,600 | 193,000 | 2,440 | 196,000 |
| New Hampshire | 12,300 | -- | 12,300 | 12,300 | -- | 12,300 |
| New Jersey | 42,700 | -- | 42,700 | 42,700 | -- | 42,700 |
| New Mexico | 18,900 2/ | W | 18,900 | W | W | W |
| New York | 78,800 | 3,730 | 82,500 | 79,000 | 4,340 | 83,300 |
| North Carolina | 87,600 | -- | 87,600 | 93,800 | -- | 93,800 |
| North Dakota | 11,800 | -- | 11,800 | 11,800 | -- | 11,800 |
| Ohio | 133,000 2/ | W | 133,000 | 133,000 3/ | W | 133,000 |
| Oklahoma | 52,400 2/ | W | 52,400 | 52,400 3/ | W | 52,400 |
| Oregon | 41,400 | -- | 41,400 | 41,800 | -- | 41,800 |
| Pennsylvania | 113,000 2/ | W | 113,000 | 111,000 | 1,410 | 113,000 |
| Rhode Island | 3,520 | -- | 3,520 | 3,520 | -- | 3,520 |
| South Carolina | 41,400 | -- | 41,400 | 45,400 | -- | 45,400 |
| South Dakota | 18,800 2/ | W | 18,800 | 23,700 3/ | W | 23,700 |
| Tennessee | 69,600 | 5,840 | 75,400 | 69,600 | 9,550 | 79,100 |
| Texas | 193,000 | 10,200 | 203,000 | 193,000 | 10,200 | 203,000 |
| Utah | 52,200 | 381 | 52,600 | 114,000 | 633 | 115,000 |
| Vermont | 10,100 2/ | W | 10,100 | 10,100 3/ | W | 10,100 |
| Virginia | 80,000 2/ | W | 80,000 | 82,400 3/ | W | 82,400 |
| Washington | 64,100 2/ | W | 64,100 | 64,700 3/ | W | 64,700 |
| West Virginia | 14,200 | 2,680 | 16,900 | 14,200 | 2,680 | 16,900 |
| Wisconsin | 72,000 | -- | 72,000 | 72,000 | -- | 72,000 |
| Wyoming | 15,100 | 9,250 | 24,400 | 16,600 | 9,250 | 25,800 |

W Withheld to avoid disclosing company proprietary data. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Includes marketable product from underground operations.

3/ Includes ore treated at underground operations.

4/ Includes aplite.

5/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

6/ Includes ore treated at surface operations.

7/ Includes marketable product from surface operations.

TABLE 7
MINING METHODS USED AT SURFACE OPERATIONS
IN THE UNITED STATES, BY COMMODITY, IN 1999

(Percentage of total material handled)

| Type of ore and commodity | Preceded by drilling and blasting | Not preceded by drilling and blasting 1/ |
|--------------------------------|---|--|
| Metal ores: | 97 | 3 |
| Beryllium | 100 | -- |
| Copper | 100 | -- |
| Gold | 97 | 3 |
| Gold-silver | 100 | -- |
| Iron | 95 | 5 |
| Magnesium metal | 48 | 52 |
| Molybdenum | 100 | -- |
| Rare-earth metals | 100 | -- |
| Silver | 100 | -- |
| Titanium | -- | 100 |
| Uranium | -- | 100 |
| Zinc | 100 | -- |
| Industrial minerals: | 51 | 49 |
| Abrasives | 100 | -- |
| Barite | 2 | 98 |
| Boron minerals | 100 | -- |
| Bromine | -- | 100 |
| Clays | -- | 100 |
| Diatomite | 3 | 97 |
| Emery | 100 | -- |
| Feldspar 2/ | 58 | 42 |
| Garnet | 60 | 40 |
| Greensand marl | -- | 100 |
| Gypsum | 92 | 8 |
| Iodine | -- | 100 |
| Iron oxide pigments | 80 | 20 |
| Kyanite | 100 | -- |
| Lithium minerals | -- | 100 |
| Magnesite | 100 | -- |
| Magnesium compounds | 30 | 70 |
| Mica (scrap) | 2 | 98 |
| Olivine | 50 | 50 |
| Perlite | 27 | 73 |
| Phosphate rock | 3 | 97 |
| Potash | -- | 100 |
| Pumice 3/ | 6 | 94 |
| Salt | 1 | 99 |
| Sand and gravel: | | |
| Construction | -- | 100 |
| Industrial | -- | 100 |
| Sericite | 100 | -- |
| Stone: | | |
| Crushed | 99 | 1 |
| Dimension | -- | 100 |
| Sulfur (Frasch) | -- | 100 |
| Talc and pyrophyllite | 85 | 15 |
| Tripoli | 100 | -- |
| Vermiculite | -- | 100 |
| Wollastonite | 100 | -- |
| Zeolites | 100 | -- |
| Metals and industrial minerals | 69 | 31 |

-- Zero.

1/ Includes drilling and cutting without blasting, dredging, and mechanical excavation and nonfloat washing, and other surface mining methods.

2/ Includes aplite.

3/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

TABLE 8
EXPLORATION ACTIVITY IN THE UNITED STATES IN 1999, BY METHOD, COMMODITY, AND STATE 1/

(Meters)

| | Churn drilling | Diamond drilling | Percussion drilling | Rotary and reverse circulation drilling | Other drilling | Trenching | Total |
|------------------------|-------------------|---------------------|------------------------|--|-------------------|-----------|---------|
| Commodities: | | | | | | | |
| Gold | -- | 94,800 | -- | 431,000 | W | 18,300 | 544,000 |
| Zinc | -- | 30,800 | W | -- | W | -- | 30,800 |
| Other 2/ | (3/) | 9,090 | (3/) | 137,000 | 60,400 | -- | 207,000 |
| Grand total | (3/) | 135,000 | (3/) | 568,000 | 60,400 | 18,300 | 782,000 |
| Percent of grand total | (4/) | 17 | (3/) | 73 | 8 | 2 | 100 |
| States: | | | | | | | |
| Alaska | -- | 26,100 | -- | 13,800 | -- | 183 | 40,000 |
| Colorado | -- | 4,260 | -- | 159,000 | -- | -- | 163,000 |
| Nevada | -- | 84,300 | -- | 250,000 | W | 18,100 | 352,000 |
| Tennessee | -- | 11,000 | W | -- | W | -- | 11,000 |
| Utah | -- | -- | -- | W | 776 | -- | 776 |
| Undistributed 5/ | (3/) | 9,090 | (3/) | 146,000 | 59,700 | -- | 215,000 |
| Grand total | (3/) | 135,000 | (3/) | 568,000 | 60,400 | 18,300 | 782,000 |

W Withheld to avoid disclosing company proprietary data; included with "Other" or "Undistributed." -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Includes beryllium concentrate, boron minerals, copper, diatomite, iron, manganese, silver, uranium, and commodities indicated by symbol W.

3/ Withheld to avoid disclosing company proprietary data; included with "Other drilling."

4/ Less than 1/2 unit.

5/ Includes California, Idaho, Minnesota, New Mexico, Oregon, South Dakota, Wyoming, and States indicated by symbol W.